

Unit: Quantitative Chemistry

IB Expectations/ Assessment Criteria

DP Group 4: Chemistry, DP - Age 16-18, Objectives

It is the intention of all the Diploma Programme experimental science courses that students achieve the following objectives.

- 1. Demonstrate an understanding of: a. scientific facts and concepts b. scientific methods and techniques c. scientific terminology d. methods of presenting scientific information.
- 2. Apply and use: a. scientific facts and concepts b. scientific methods and techniques c. scientific terminology to communicate effectively d. appropriate methods to present scientific information.
- 3. Construct, analyse and evaluate: a. hypotheses, research questions and predictions b. scientific methods and techniques c. scientific explanations.
- 4. Demonstrate the personal skills of cooperation, perseverance and responsibility appropriate for effective scientific investigation and problem solving.
- 5. Demonstrate the manipulative skills necessary to carry out scientific investigations with precision and safety.

Approach

Significant concept(s) / Considerations

Practice driven since the topic is mathematical.

Mole and Stoichiometry.
Gas laws.

Guiding Questions

Learner Profile

Which unit of measurement is the most appropriate to be used in Chemistry?

- Thinkers
- Principled
- Balanced
- Reflective

Central Idea / Content

Learning Objectives

The mole concept and Avogadro's constant

Formulas

Chemical equations

Mass and gaseous volume relationships in chemical reactions

Apply the mole concept to substances.

Determine the number of particles and the amount of substances (in moles).

Define the terms relative atomic mass (A_r) and relative molecular

Solutions.	<p>mass (M_r)</p> <p>Calculate the mass of one mole of a species from its formula.</p> <p>Solve problems involving the relationship between the amount of substance in moles, mass and molar mass.</p> <p>Distinguish between the terms empirical formula and molecular formula.</p> <p>Determine the empirical formula from the percentage composition or from other experimental data.</p> <p>Determine the molecular formula when given both the empirical formula and experimental data.</p> <p>Deduce chemical equations when all reactants and products are given.</p> <p>Identify the mole ratio of any two species in a chemical equation.</p> <p>Apply the state symbols (s), (l), (g) and (aq).</p> <p>Calculate theoretical yield from chemical equations</p> <p>Determine the limiting reactant and the reactant in excess when quantities of reacting substances are given.</p> <p>Solve problems involving theoretical, experimental and percentage yield.</p> <p>Apply Avogadro's law to calculate reacting volume of gases.</p> <p>Apply the concept of molar volume at standard temperature and pressure in calculations.</p> <p>Solve problems involving the relationship between temperature, pressure and volume for a fixed mass of an ideal gas.</p> <p>Solve problems using the ideal gas equation, $PV = nRT$.</p> <p>Analyse graphs relating to the ideal gas equation.</p> <p>Distinguish between the terms solute, solvent, solution and concentration (g dm^{-3} and mol dm^{-3})</p> <p>Solve problems involving concentration, amount of solute and volume of solute.</p>
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<u>Assessment</u>		
Worksheets/Assignments Summative: Other Written Assessment Worksheets to assess the students' learning on a daily basis.		
Quizzes and a unit Test Summative: Standardized Test Quizzes to be given on a regular basis and a unit test to be taken.		
Labs Summative: Lab Assignment Several labs to be done on DCP.		
Information Literacy & ICT	International Mindedness	TOK
Use of computers to generate and analyze gas graphs.	The unit of measurement has to be international to bring about uniformity of concepts and ideas.	Assigning numbers to the masses of the chemical elements allowed chemistry to develop into a physical science and use mathematics to express relationships between reactants and products.
Strategies / Activities / Differentiation		Resources
Extra classes for students needing inputs.		Chemistry Course Companion Teacher assisted learning materials Independent research instruments Worksheets
Unit Reflections		